



Publication number: **0 447 346 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(21) Application number: 91500017.8

(51) Int. Cl.<sup>5</sup>: F16L 47/00

(22) Date of filing: 14.02.91

(30) Priority: 12.03.90 ES 9000739

(43) Date of publication of application:  
18.09.91 Bulletin 91/38

(84) Designated Contracting States:  
BE DE FR GB GR IT NL

(71) Applicant: GOIZPER, S. COOP. LTDA.  
Barrio Antigua s/n  
E-20577 Anzuola Guipuzcoa (ES)

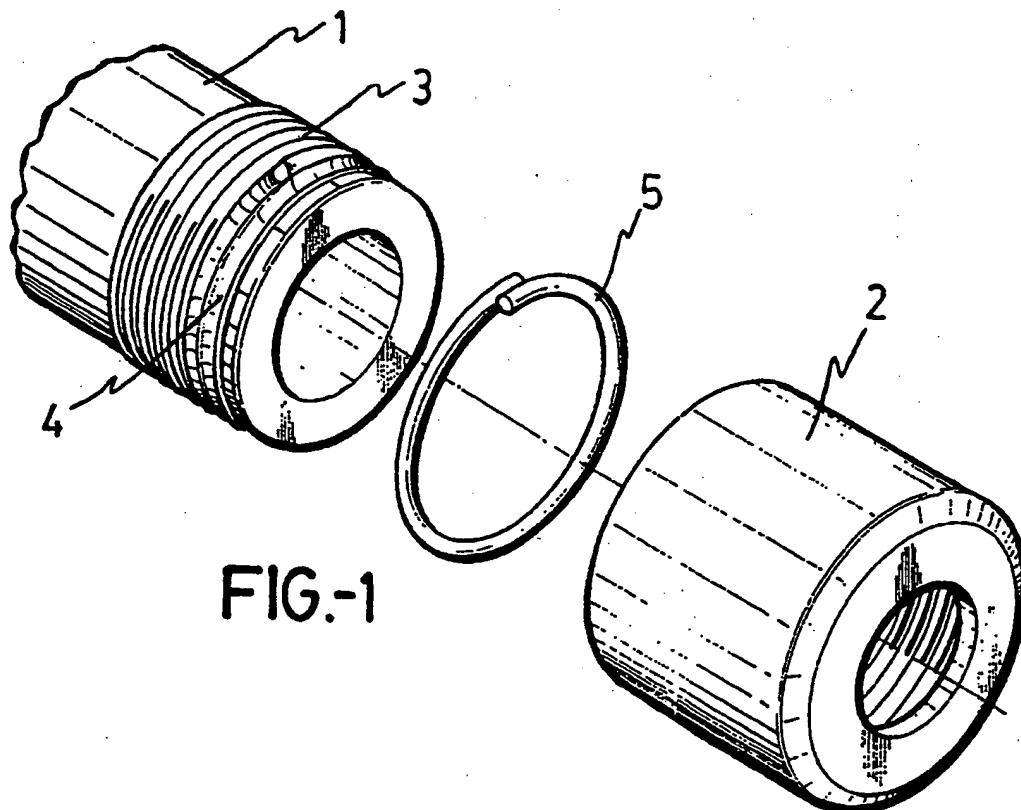
(72) Inventor: Legorburu Gabillondo, Francisco  
Barrio Antigua, s/n  
E-20577 Anzuola, (Gulp zcoa) (ES)

(74) Representative: Carpintero Lopez, Francisco  
HERRERO & ASOCIADOS, S.L. Alcalá, 21  
E-28014 Madrid (ES)

(54) Improvements in threaded couplings between parts of different hardness.

(57) In the field of adaptors, for instance, connectors are frequently used between parts of different hardness, flat plastic or like parts and hard metal parts, where the soft parts can be damaged upon coupling.

The improvements involve providing the soft part, whether a bolt or male part (1), or a nut or female part (6), with a groove (4) at the first turn of the screw thread thereof, which groove is designed for a ring (5) made of a hard and resilient material to fit in snugly, thereby to define a coupling front or guide for the hard part, whether a nut or female part (2) or a bolt or male part (7).



**FIG.-1**

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## IMPROVEMENTS IN THREADED COUPLINGS BETWEEN PARTS OF DIFFERENT HARDNESS

### OBJECT OF THE INVENTION

The present invention relates to a series of improvements introduced in threaded couplings between parts of different hardness, specifically hard and soft parts, for instance a metallic part and a plastic part, which improvements are aimed at protecting the soft part so that its screw thread is not damaged by the hard part, when they are coupled together.

### BACKGROUND TO THE INVENTION

It is a well-known fact that adaptors made of a soft material, namely plastics, resins, etc., are frequently used to screw metallic parts to each other and vice versa. This is the case of adaptors used for watering equipment, adaptors used in fumigators or sprays for farming purposes, and so on.

These unions, when effected using identical or similar materials, for instance plastic nut and plastic bolt or metal nut and metal bolt, pose no problems whatsoever, and yet when materials of different hardness are used together, for instance when the nut is metallic (hard) and the screw plastic (soft), and particularly when the screw threads are rather thin, special care is required for the nut's screw thread to register with the bolt's screw thread, for the metallic element's screw thread could act as a diestock on the plastic element, along a slightly oblique axis as regards the original screw thread, causing the nut to be seized without same or the bolt being able to move forward, and the nut itself thus being ruined, for the original screw thread will have been partially or completely eliminated. This problem obviously arises both when the nut is hard and the bolt soft, and, alternatively, when the nut is soft and the bolt hard.

### DESCRIPTION OF THE INVENTION

The improvements in threaded couplings between parts of different hardness subject hereof have been designed to fully solve the above problems.

More specifically, and in order to achieve the above, such improvements comprise replacing the first turn of the part made of soft material, whether the male part or the female part, i.e., the nut or the bolt, with a groove, for instance a bead-shaped groove, with a diameter equivalent to the thread pitch, such groove housing an open ring made of a hard material, of, for instance, circular section with an effective diameter equivalent to the pitch but with an original internal diameter smaller than the back end of the groove in the case of a male element, such as a bolt, or greater than the back end of the groove, in the case of a female element, such as a nut, in order that resi-

lient stretching shall be required to assemble same in the said soft element's groove, where such ring fits in snugly or is kept firmly in place upon springing back.

Obviously, and although a bead shape has been deemed preferable for the soft part's groove and a circular section for the ring, such elements can have a square, polygonal, diamond-shaped and other section at all events associated to each other, without this affecting the essence of the invention.

### DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a single sheet of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1. - Is a perspective view of the constituent elements of two parts of differing hardness, designed to be threadedly coupled to each other, and provided with the improvements subject hereof, with the male part being the soft part.

Figure 2. - Is another perspective view of the metallic open ring duly attached to the said male part.

Figure 3. - Is a partial cross-section of the duly coupled elements of figure 1.

Figure 4.- Is, finally, a side elevation view and diametrical section of two other parts that can be threadedly coupled, likewise provided with the improvements subject hereof, but where the female part is the soft part.

### PREFERRED EMBODIMENT OF THE INVENTION

In the light of these figures it is clear that the improvements subject hereof are applicable to parts due to be threadedly connected or coupled together, having, as aforesaid, a different grade of hardness, for instance a soft male part (1), as a bolt, and a hard part (2), as a nut.

Now then, such improvements comprise providing the soft part, specifically the male part (1), at its screw thread (3) and more specifically at the terminal end thereof, with a groove (4) roughly on the first turn and designed for an open metallic ring (5) to fit in snugly, as shown in figure 2.

This ring (5) fits in snugly in the groove (4) in part (1) since its original diameter is rather smaller than that of the male part (1), and such ring must be resiliently stretched to be coupled in the groove (4), and therefore, upon release, when it springs back, such ring will fix and attach itself in place.

Thus, the ring (5) can act as a guide in the threaded coupling of parts (1) and (2), the hard part

(2) meeting the soft part (1) through the ring (5), the metal/metal contact preventing the said soft part from being damaged.

Alternatively, i.e., when the soft part is the female part, as in (6) in figure 4 and the hard or metallic part is the male part (7), the groove (4) is provided in the first turn of the said female part (6), as a nut, and in this case the diameter of the ring (5) is oversized as regards the female part's (6) diameter, and it is therefore necessary to provide same with radial shrinkage to infix same within the nut, and therefore, upon springing back, it pushes firmly against the back end of the groove (4), as above.

Though in the preferred embodiment shown in the drawings, the groove (4) is bead-shaped and the open ring (5) has a circular section, such elements need only have a formal correspondence, and may be of square, polygonal, diamond-shaped or such other section as shall be deemed appropriate, without this affecting the essence of the invention, for the ring (5) will in any case define a "hard front", firmly attached to the soft part and protecting same when coupled to the hard part.

We feel that the device has now been described at sufficient length for any expert in the art to have grasped the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

## Claims

1.- Improvements in threaded couplings between parts of different hardness, specifically between a hard part, for instance a metallic part, and a soft part, for instance a plastic, resin or like part, essentially characterised in that the soft part, regardless of whether it is a male part, as a bolt, or a female part, as a nut, is provided with a groove to replace its first turn, part of same or several turns, with a metallic open ring fitting snugly in such groove or grooves to define a coupling front or guide for such soft part to such hard part.

2.- Improvements in threaded couplings between parts of different hardness, as in claim 1, characterised in that when the soft part is the male part, the resilient metallic ring is diametrically undersized as regards such male part, so that same must be resiliently stretched in order to be coupled to the said male part, being fixed in the relevant groove when it springs back on its own.

3.- Improvements in threaded couplings between parts of different hardness, as in claim 1, character-

ised in that when the soft part is the female part, the hard and resilient open ring is oversized as regards such female part's thread pitch and it is therefore necessary to resiliently compress same in order that it can be infixed in the said female part, fitting in snugly in the groove housing same when it springs back on its own.

4. - Improvements in threaded couplings between parts of different hardness, as in preceding claims, characterised in that the hard resilient ring and the groove in the soft part housing same have associated sections, and it is envisaged that such ring is preferably of circular section, though it could just as well be polygonal.

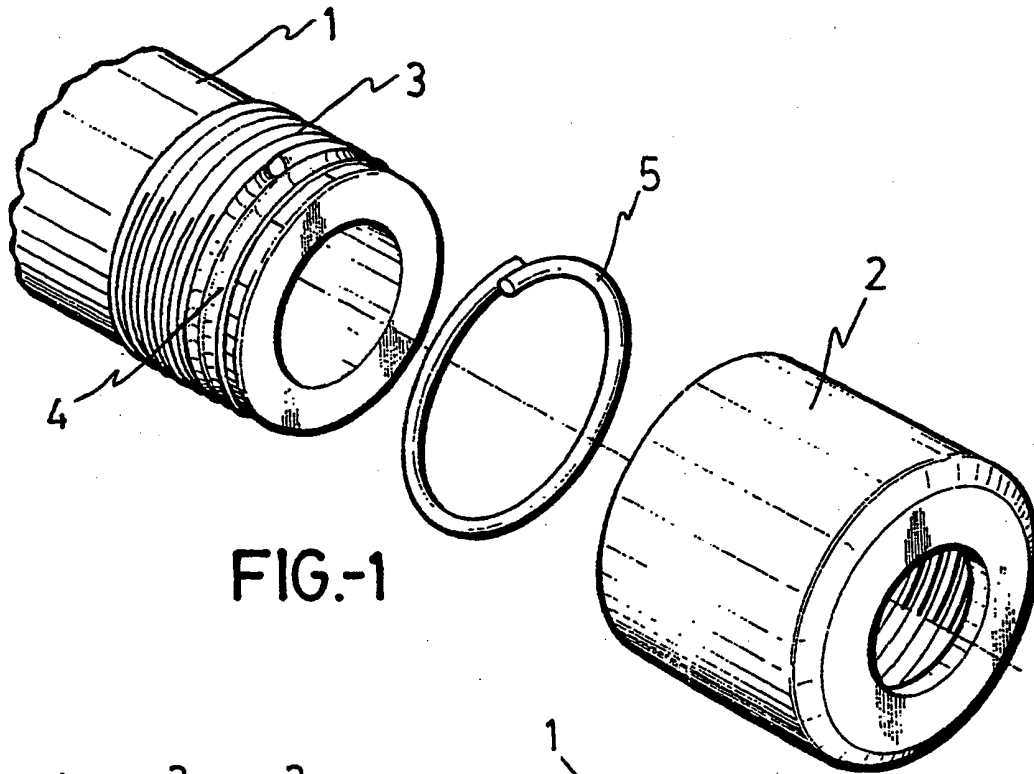


FIG.-1

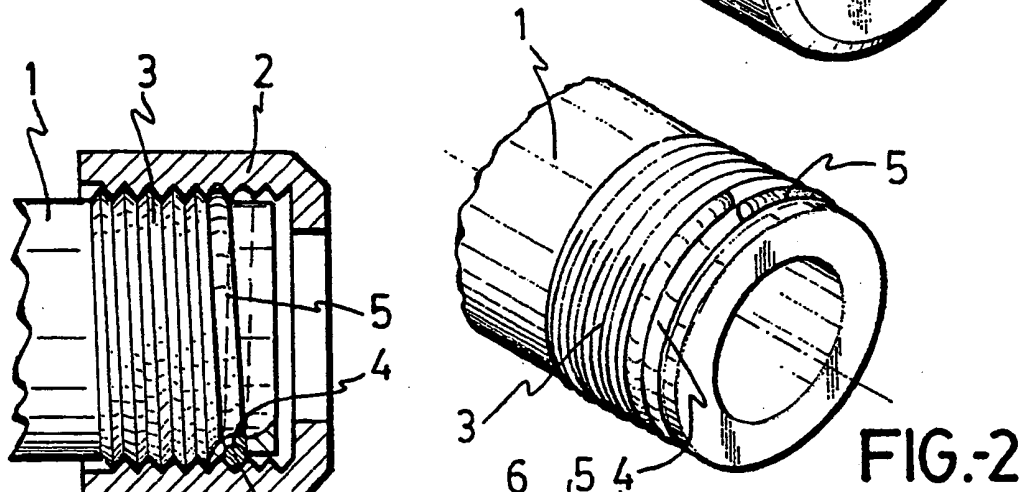


FIG.-2

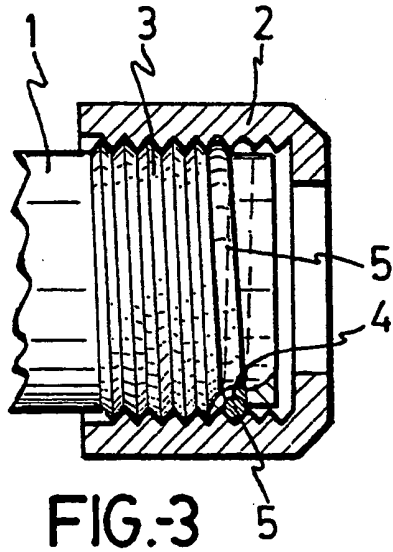


FIG.-3

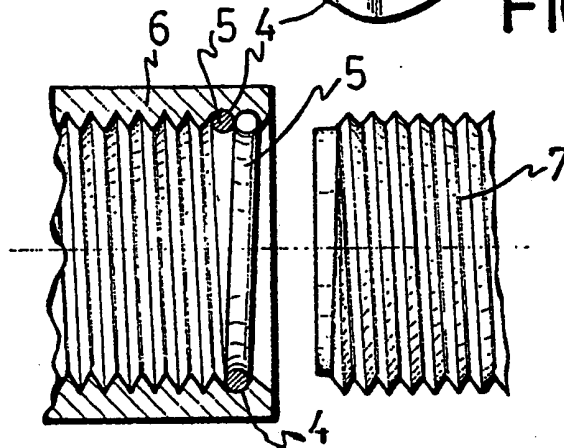


FIG.-4